Citizens, from consumers to prosumers: e-Government Services typologies revisited

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Abstract. Traditionally, eGovernment services have been classified according to a four step ladder, with increasing complexity, and an underlying assumption that the more complex, the better. In this paper, I argue that this classification is severely limited, in the light of the active role a citizen should be able to play in the society, not only consuming public services, but also being actively involved in producing content in connection to public service provision. Whereas dramatic changes are found in other areas of the IT-world, e.g. in the media where the contributions of individuals are getting just as important as that of traditional organizations, and where so-called Web 2.0 services outperform services made in a more traditional manner, these ideas do not seem to yet have reached the eGovernment sector.

1 Introduction

Two of the most exciting current families of technologies for transforming the World Wide Web can be placed under the headings of "Web2.0" and the "Semantic Web". Each has a separate vision for transforming the relatively static Web, driven by focused content providers and enabled by passive HTML, into a dynamic and largely self organizing entity. While the general vision of the emergence of an organic Web is shared, the details of the two approaches appear to be opposites. While Web2.0 is focused on a free-form, user generated ad hoc content provision and opportunistic social organization, the Semantic Web contains a vision of strict and enforced structure which makes it suitable for automated machine processing. For eGovernment application, we see an increasing interest in semantic web technology to provide interoperable services (see e.g. [1]). On the other hand, user driven approaches as exemplified by Web 2.0 is harder to find, although certain eParticipation initiatives have traces of this.

The conception of the term "Web2.0" can be traced to a conference brainstorming session between the O'Reilly group and MediaLive International [6], who noticed that there seemed to be a number of new, successful services that had began to spread, and which seemed to have certain qualities in common. A hallmark of the successes was that they leveraged user-provided content and collective intelligence through applications that grew more feature rich as more people used them. Together these applications presage an emerging era where the personal computer is superseded by the Internet as an application platform. Many of the ideas and technologies are not revolutionary, or even new. What distinguishes Web2.0 is the

unique superimposition of many existing ideas and technologies that collectively usher in a new kind of user experience.

One important hallmark of Web2.0 applications is that they tend to be based around web services so that there is no requirement to install a special application on a client machine. This already introduces a new dynamic to the application space since functionality can change incrementally and with an extremely fast life cycle. This development model is complimented by an architecture in which constant evolution makes sense. This "architecture of participation" is exemplified in P2P networks such as BitTorrent where clients automatically and simultaneously become servers, and the service as a whole improves the more people that use it. Similarly, eBay's services are entirely dependent on the participation of its members, and increasing levels of participation can enable the gradual implementation of feature refinements. Amazon.com is another service where users add value by default: whenever they purchase multiple items, add reviews, add items to the wish list, and in general simply "use" the system, they contribute data which in aggregate can improve the service to other customers by providing recommendations and associations which would otherwise not exist. The web service is then improved to make new use of the accumulating data. The architecture is designed by default to improve the service simply as a side effect of its ordinary use.

This participatory architecture enables the harnessing of collective intelligence by aggregating user data, which is the second main feature of Web2.0 applications. One well-known achievement in this vein is Wikipedia, a brave experiment in creating a collaborative encyclopaedia which, ideally, anyone could contribute to. Amazingly, this manifestation of a radical departure from the kind of authoritarian editorial style on might expect for a reference of this magnitude, have proved to be able to deliver a product comparable to the most venerable Encyclopaedia Britannica. A similar challenge is being laid to traditional news services by the activity of blogging in general, and services like slashdot and digg, in particular. These activities aided by search tools like Technorati together with syndication and other tools like RSS and trackbacks, make it possible for news and opinions to be disseminated and discussed very rapidly.

The Semantic Web, on the other hand, is a much more architected view of the future in which new approaches and technologies play a big part. The vision was outlined by Tim Berners Lee et al. in a Scientific American article in 2001, and presented a view of a future web in which meaning is embedded into resources in a way that is sufficiently explicit for automated computational agents to operate on. In the words of Berners-Lee "the Semantic Web is specifically a web of machine-readable information whose meaning is well-defined by standards: it absolutely needs the interoperable infrastructure that only global standard protocols can provide." [2]. Many of the new technologies and standards that were outlined by Berners-Lee et. al., and which are collectively necessary for a Semantic Web have become widely known and some have made contributions to enhance data processing on the current web. XML is perhaps the runaway success story enjoying widespread adoption, but also RDF is being used as a data model for local web sites and intranets, and Ontologies, sometimes together with description logic reasoners, are being used in smaller scale knowledge based applications.

2 eGovernment services

Public services are provided through a number of organizational entities on different levels (in Norway; Communes, Counties, and State). On the traditional user-side we have two main

groups (with large individual differences): Citizens and businesses. Both citizens and businesses have a large number of ongoing or latent processes, many of which include steps where public services are needed, often because of public regulations, obligations to the society or rights as a citizen.

A typology of eGovernment services, illustrated in Figure 1, was proposed by EU some years ago, and is still in use in connection to comparing the eGovernment service provision maturity in different countries [3]. The higher levels indicates a higher level of complexity (and potential efficiency), but are much geared towards the internal integration in government, not taking into account the complexities of the interaction and collaboration between all players, including different citizens and private companies in their interaction with public sector and each other. This point is also raised by Cap Gemini [3] pointing to (and suggesting) extended frameworks for measurement and categorization taking into account developments as the semantic web, web2.0, integrated cooperation between citizens, businesses and governments etc.

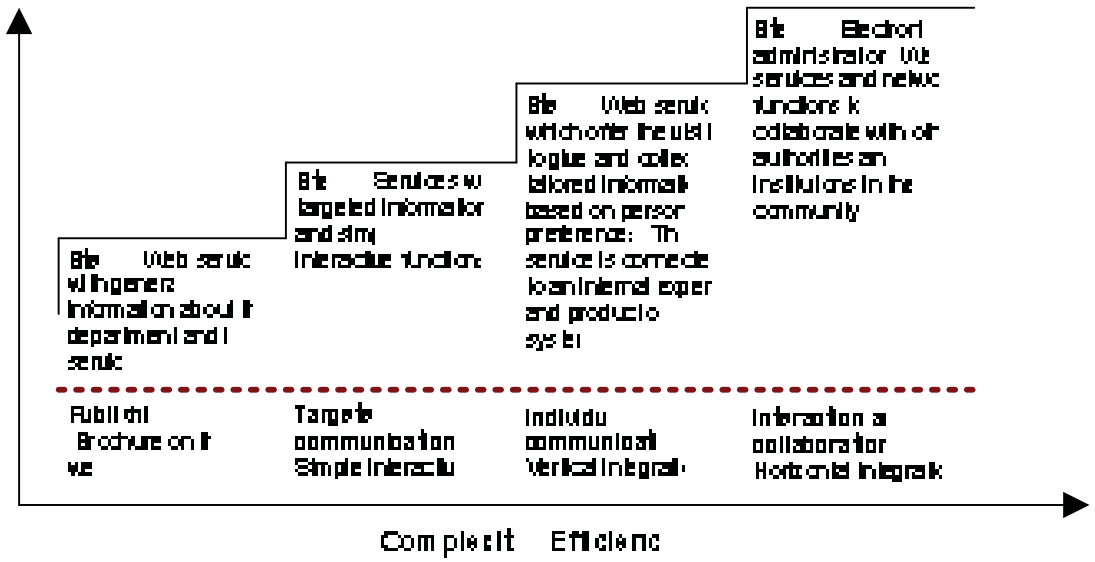

Fig. 1: The service stairs

One alternative view to the service steps is to look at public services along two orthogonal axis; actor-complexity and process-integration

Actor-complexity:

- Is one or more actors outside the public sector involved as benefiting or delivering the service (citizens, business, or community)? An example of a community-service is a common web-area for the parents of the children in a school. Public hearings provide another basis for such a community. If there are many users, it can be differentiated if the users are of the same type, or of different types.
- Is it one or more public sector entity involved in delivering or benefiting from the service?

The process integration among the actors involved can be on several levels

- Information: E.g. information provided by a static web-page from a public entity to a citizen. No process integration
- Co-ordination: At certain point, data and control goes from one actor to another. This co-ordination can be manual or automated. A web-form for providing input can act as a manual co-ordination point, whereas the automatic transfer of data from the accounting system of a company to the tax authorities can acts as an automatic co-ordination point.
- Cooperation: Different actors are involved at the same process step.
- Collaboration: Different actors participate at the same process step to create a common product. An example is the parent organization at the school (in Norway, FAU – Foreldrenes arbeidsutvalg) that together with the school develop information bulletins for all parents, teachers and pupils.

In Table 1, the connection between this classification and the current typology is indicated, showing that large areas are not covered. Interestingly, these are the areas where closer cooperation and collaboration between actors across the public and the private sector is necessary, which is also typical for the Web2.0 kind of applications. Thus this also indicates a need for more work both to provide such services, and making them usable to actually be able to involve citizens as active users and content providers on a large scale. Current developments to provide such an environment will briefly be pointed out in the next section.

Table 1: Public Service typology

Actor complexity vs. Process integration	1 Private Sector – 1 Public Sector	N Private Sector– 1 Public Sector	1 Private Sector – N Public Sector	N Private Sector- N Public Sector
Information	Step 2	Step 1	Step 4	
Manual Co-ordination	Step 2		Step 4	
Automatic Co-ordination	Step 3		Step 4	
Co-operation				
Collaboration				

3 Towards an infrastructure for eGovernment services for cooperation and collaboration

The present approach was originally developed for supporting dynamic networked organizations (DNO) [4]. A DNO is being developed more or less ad-hoc to reach a certain goal based on the resources of several co-operating enterprises. Such networks consist of independent partners, unlike top-down virtual enterprises where the main partner lays down the rules for coordination, e.g. in outsourcing agreements. The partners aim to harvest knowledge from the DNO to be reused in their traditional organization, and in other DNO's. The approach is based on the use of so called interactive models, and model-generated work

places (MGWP), which taken over into the eGovernment area for private-public co-operation and collaboration can be translated to model-generated Living Places (MGLP).

An interactive model [5] is a visual externalization of aspects such as tasks, roles, persons, and goals in a co-operation/collaboration that can be viewed, traversed, analyzed, simulated, adapted and executed by users. What does it mean that the model is interactive? First of all, the visual model must be available to the users of the underlying information system at runtime. Second, the model must influence the behaviour of the computerised support system. Third, the model must be dynamic, users must be supported in changing the model to fit their local reality, enabling tailoring of the system's behaviour. Users thus manipulate and utilise interactive models as part of their day-to-day work.

A model-generated workplace (MGWP) is a working environment for the users involved in the tasks. It is a user platform that provides the graphical front-end for human users to interact with software services supporting their activities.

The living place can be tailored to meet the specific requirements of different roles or persons, providing customized presentation and operation views. This is achieved through model-configured and user-composable services (MUPS). These services make use of the interactive knowledge models to generate context-aware graphical user interfaces. The way the users themselves can change and shape their working environments and the working environment for their peers resembles to a large degree what you also find in traditional web 2.0 technology such as wikis. Thus, we have experience with testing out model generated solutions to support the example collaboration scenario above.

4 Conclusions and Further Work

Interactive models allow networked organisations to control and customize their IT infrastructure through visual modelling of work processes. We have started to also use the approach for the development and evolution of workplaces for private-public co-operation, e.g. to support FAUs. Looking on this relative to the Web2.0 approaches, it can be argued that the modeling-oriented approach is a bit more formal than many of these initiatives, although it should not be regarded as such by the normal user when the underlying infrastructure is first established.

Experiences from public and private sector on this approach indicates new challenges for full participation, challenges which does not seem to be looked on in detail yet in the traditional usability literature. It might for instance be an issue that the higher involvement will be difficult to master for certain citizens, and that a new digital divide appears, between those that only consumes, and those which also produce.

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